

**What is claimed is:**

1. A packet switch device switching packets, comprising:

a distributing unit sequentially distributing  
5 input packets to a plurality of paths in an arrival order in units of packets;

a switch unit switching the packets input from said distributing unit via the plurality of paths, and outputting the packets; and

10 a multiplexing unit multiplexing the packets output from said switch unit by performing a process inverse to the packet distribution process performed by said distributing unit.

15 2. The packet switch device according to claim 1, wherein:

said distributing unit multiplexes a plurality of input highway packets on a same path by assigning fixed-order time slots to the plurality of input highway  
20 packets;

said switch unit switches the plurality of packets on the same path after demultiplexing the packets for each input highway; and

said multiplexing unit multiplexes a plurality of  
25 output highway packets on a same path.

3. The packet switch device according to claim 1, wherein

at least one switch unit is arranged, and each  
5 switch unit is logically divided into a plurality of switch units, so that packets are switched.

4. The packet switch device according to claim 1, wherein:

10 said distributing unit, said switch unit, and said multiplexing unit are prepared respectively for a plurality of lines;

when a distributing unit and a multiplexing unit, which have different numbers of accommodated lines, are  
15 arranged, a number of switch units to be multiplexed, a number of switches into which said switch unit is divided, a number of switch units to be arranged are made to match numbers required by a distributing unit and a multiplexing unit, which have a maximum number  
20 of accommodated lines, so that the distributing unit and the multiplexing unit, which have different number of accommodated lines, can be arranged.

5. The packet switch device according to claim 25 1, wherein

said distributing unit, said switch unit, and said multiplexing unit comprise

an offset adding unit adding a predetermined value different depending on each input highway to a tag which indicates an output route and is possessed by an input packet,

a switch unit outputting the packet to a corresponding switch port according to the tag to which an offset value is added,

a selector unit making a correspondence between a switch port to an arbitrary highway, and

a highway multiplexing unit multiplexing a plurality of highways for one output port.

6. The packet switch device according to claim 1, further comprising

an input buffer unit temporarily storing a packet on an input side of the packet, wherein

when said switch unit is expanded, said distributing unit, said multiplexing unit, and said switch unit are expanded, and operations of said distributing unit, said multiplexing unit, and said switch unit are changed after a packet output of said input buffer unit is once suspended, and the packet output of said input buffer unit is resumed, so that

the switch unit can be expanded online.

7. The packet switch device according to claim 6, wherein

5 whether a packet is either discarded or buffered in said input buffer unit can be selected depending on a characteristic of the packet that arrives while the packet output of said input buffer is suspended.

10 8. The packet switch device according to claim 6, wherein:

said distributing unit, said multiplexing unit, and said switch unit comprise a register unit for setting an output route of a packet; and

15 said register unit comprises a plurality of registers holding values that are possibly used.

9. The packet switch device according to claim 6, wherein:

20 said distributing unit, said multiplexing unit, and said switch unit comprise a register unit for setting an output route of a packet; and

said register unit comprises a first register holding a currently used value, and a second register  
25 for setting a value used after an operation change is

set.

10. A switch in a packet switch device making switching in units of packets, comprising:

5 an offset adding unit adding a predetermined value different depending on each input highway to a tag which indicates an output route and is possessed by an input packet;

10 a switch unit outputting the packet to a corresponding switch port according to the tag to which an offset value is added;

a selector unit making a correspondence between a switch port to an arbitrary highway; and

15 a highway multiplexing unit multiplexing a plurality of highways for one output port.

11. A packet switching method switching packets, comprising:

20 sequentially distributing input packets to a plurality of paths in an arrival order in units of packets;

switching the packets input in the distributing step via the plurality of paths, and outputting the packets; and

25 multiplexing the packets output in the switching

step by performing a process inverse to the packet distribution process in the distributing step.

12. The packet switching method according to claim 11, wherein:

the distributing step multiplexes a plurality of input highway packets on a same path by assigning fixed-order time slots to a plurality of input highway packets;

the switch step switches the plurality of packets on the same path after demultiplexing the plurality of packets on the same path; and

the multiplexing step multiplexes a plurality of output highway packets on a same path.

13. The packet switching method according to claim 11, wherein

the distributing step, the switching step, and the multiplexing step comprise

adding a predetermined value different depending on each input highway to a tag which indicates an output route and is possessed by an input packet, outputting the packet to a corresponding switch port according to the tag to which an offset value is added,

making a correspondence between a switch port to an arbitrary highway, and

multiplexing a plurality of highways for one output port.

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14. The packet switching method according to claim 11, further comprising

providing an input buffer once storing a packet before a packet is processed in the distributing step.

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15. The packet switching method according to claim 14, wherein

after a packet output in the input buffer step is suspended, units used in the distributing step, the switch step, and the multiplexing step are expanded, and the packet output in the input buffer step is resumed upon completion of expansion.

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16. The packet switching method according to claim 15, wherein

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whether a packet is either discarded or buffered in the input buffer step can be selected depending on a characteristic of the packet that arrives while the packet output in the input buffer step is suspended.

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17. A switching method for use in a packet switch device making switching in units of packets, comprising:

5 adding a predetermined value different depending on each input highway to a tag which indicates an output route and is possessed by an input packet;

outputting the packet to a corresponding switch port according to the tag to which an offset value is added;

10 making a correspondence between a switch port to an arbitrary highway; and

multiplexing a plurality of highways for one output port.